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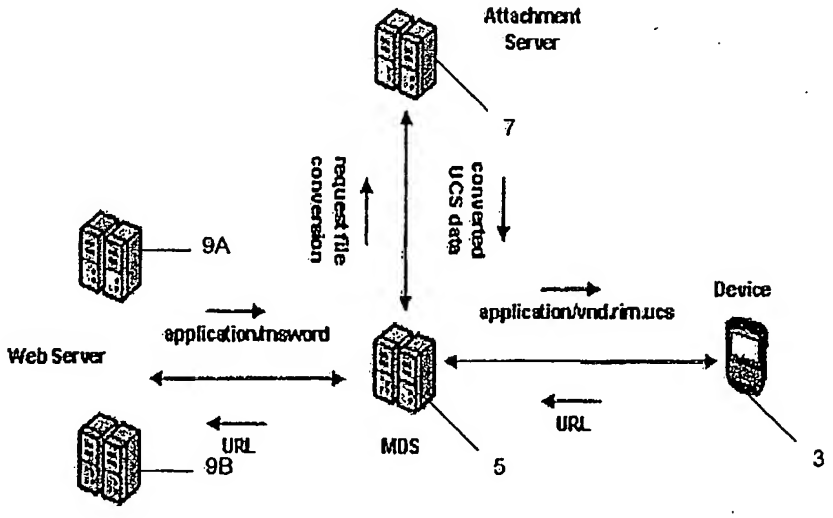
[Continued on next page]

(54) Title: URL DOCUMENT VIEWING THROUGH A PLUG-IN APPLICATION FOR A MOBILE BROWSER ON A WIRELESS DEVICE



(57) Abstract: A method is set forth of displaying a document identified by a URL on a mobile browser (Figure 3), comprising registering an attachment viewer plug-in to the mobile browser for a predetermined data stream content type, registering a mobile data service transcoder for predetermined document types, sending a request for the document of one of the predeteremined document types from the mobile browser (3) to the mobile service transcoder (5), retrieving and converting the document to the predetermined data stream content type, and forwarding the converted document from the mobile data service transcoder to the mobile browser for display via the attachment viewer plug-in.

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URL DOCUMENT VIEWING THROUGH A PLUG-IN APPLICATION FOR A MOBILE BROWSER ON A WIRELESS DEVICE

BACKGROUND

1. Field

[0001] The present disclosure is directed to wireless communication devices, and more particularly to a method and apparatus for viewing documents identified by a Uniform Resource Locator (URL) from a mobile browser on a wireless communication device.

2. Description of the Related Art

[0002] Internet browser applications are well known for displaying web page content as hypertext, and for permitting user navigation between pages and downloading of documents through the use of Uniform Resource Locators (URLs). Document viewing in this manner using a desktop PC involves downloading the document and either launching the original authoring application to display the downloaded document or viewing the document through an application browser plug-in. For mobile devices, document viewing is accomplished by downloading the document onto the mobile device and launching a mobile edition of the original authoring application to display the document.

SUMMARY

[0003] It is an aspect of the present specification to set forth a method and apparatus for viewing the content of a document pointed to by a URL while browsing a web page using a mobile device and viewing this content within the context of the browser application, without having to launch a mobile edition of the original authoring application.

[0004] The above aspects can be attained by a method of displaying a document identified by a URL on a mobile browser, comprising registering an attachment viewer plug-in to the mobile browser for a predetermined data stream content type, registering a mobile data service transcoder for predetermined document types, sending a request for the document of one of the predetermined document types from the mobile browser to the mobile service transcoder, retrieving and converting the document to the predetermined data stream content type, and forwarding the converted document from the mobile data service transcoder to the mobile browser for display via the attachment viewer plug-in.

[0005] The above aspects can likewise be attained by an apparatus for displaying a document of a predetermined document type identified by a URL on a mobile browser, comprising an attachment viewer plug-in to the mobile browser for displaying attachments conforming to a predetermined data stream content type, and a mobile data service transcoder for receiving a request for the document from the mobile browser and initiating

retrieval and conversion of the document from the predetermined document type to the predetermined data stream content type, and transmitting the converted document to the mobile browser for display via the attachment viewer plug-in.

[0006] These together with other aspects and advantages which will be subsequently apparent, reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figures 1A and 1B show a mobile browser user interface with a document identified by a URL.

[0008] Figure 2 shows the document displayed using a plug-in to the mobile browser.

[0009] Figure 3 is a block diagram showing plug-in data flow between the device, a Mobile Data Service (MDS), Web Server and Attachment Server, according to the preferred embodiment.

[0010] Figures 4A shows operation of the mobile browser and plug-in, according to the preferred embodiment.

[0011] Figure 4B shows operation of an MDS transcoder, according to the preferred embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Before discussing the architectural implementation of the preferred embodiment, reference will be made to Figures 1 and 2, showing an exemplary mobile browser user interface for displaying a document identified by a URL in a web page.

[0013] In Figure 1A, a URL for a document (Executive Resume) is shown within a web page (i.e. Google Search). An indication is provided (i.e. DOC) that the documented is a supported MIME (Multipurpose Internet Mail Extensions) type (i.e. MS Word®). In response to user selection of the URL, a pop-up menu appears with a "Get Link" command that, when selected, causes a browser plug-in application to display the downloaded document, as shown in Figure 2.

[0014] A preferred embodiment of the method and apparatus for viewing the documents displayed via the user interface of Figures 1 and 2, is set forth in Figure 3. The mobile device 3 incorporates a web browser and an Attachment Viewer (referred to herein as "DocView") plug-in for the browser to permit viewing supported document MIME types when a valid URL from a web page points to a document, as discussed above in connection with Figure 1A.

[0015] During start-up (step A1 in Figure 4A), the Attachment Viewer browser plug-in ("DocView") registers itself (step A2) for a predetermined data stream content type, such as Universal Content Stream (UCS). According to the preferred embodiment, the browser plug-in registers an "application/vnd.company.ucs" content type with the browser, such that the browser adds "application/vnd.company.ucs" to the "Accept" header when requesting HTTP URLs.

[0016] Mobile Data Service (MDS) 5 forms a secure communication conduit between the mobile device 3 and servers, such as Web Servers 9A, 9B, etc., and Attachment Server 7. The MDS 5 functions as an HTTP and TCP/IP proxy with special features. MDS 5 incorporates a UCS transcoder that registers itself at start-up (step B1 in Figure 4B) for all MIME content types (step B2 in Figure 4B) supported by the Attachment Server 7 (e.g. "application/ms-word", "applications/ms-excel", etc). The Attachment Server 7 performs document conversion of attachments to a form suitable for transmission to the device 3 and display thereby. For example, if the attachment is a MS Word® document, the Attachment Server 7 performs a binary conversion of the document into UCS format, suitable for wireless delivery. The UCS format supports text, image, vector and hybrid content. Text content retains some of its original formatting, such as bold, italic and underlining, but the UCS rich text file is much smaller than the original document (e.g. 10% of the original document size).

[0017] The following content types are registered by the MDS transcoder:

Content Type	Application
Application/msword	Microsoft Word
Application/vnd.ms-excel	Microsoft Excel
Application/vnd.ms-powerpoint	Microsoft PowerPoint
Application/pdf	Adobe PDF
Application/wordperfect5.1	Corel Word Perfect 5.1
Application/vnd.wordperfect	Corel Word Perfect

[0018] When a user selects "Get Link" (Figure 1B and step A4 in Figure 4A) for a URL that points to a supported content type (Figure 1A and step A3 in Figure 4A), an HTTP request is sent (step A5 in Figure 4A) to the MDS 5 with "application/vnd.company.ucs" added to the "Accept" header. Upon receipt of the HTTP request from the Browser (step B3 in Figure 4B), the MDS 5 sends the HTTP request (step B4 in Figure 4B) to the destination web server (e.g. Web Servers 9A, 9B, etc.) along with the document types that can be converted (e.g. "application/pdf") from native form to UCS data by the Attachment Server 7. The MDS 5 sends all acceptable content types to the destination server, because the UCS

transcoder has registered a list of acceptable contents that can be transcoded into UCS, and the device 3 accepts UCS data.

[0019] Upon retrieving the page content from the Web Server (step B5 in Figure 4B), MDS 5 transmits the data via the "application/vnd.company.ucs" transcoder to the Attachment Server 7 for conversion (step B6 in Figure 4B). Upon successful binary conversion of the document to a UCS data stream, the Attachment Server 7 transmits the UCS data back to MDS 5 transcoder (step B7 in Figure 4B), which then sends it to device browser 3 via HTTP response (step B8 in Figure 4B), and the transcoder process ends (step B9 in Figure 4B).

[0020] The MDS 5 pushes UCS data for the document back to the device 3 in the HTTP response (to a limit of 250 KB in the preferred embodiment, which is the default MDS setting). Upon receipt of the "application/vnd.company.ucs" content type stream (for which it registered at start up), the browser invokes the "DocView" plug-in to display the UCS data, as shown in Figure 2. More particularly, the browser requests the DocView plug-in for a "BrowserContent" object. Once the browser receives the object it calls a finishLoading method. The Browser Plug-in invokes the Attachment Viewer passing the HTTP Input Stream as an input parameter. Then, the Attachment Viewer parses the UCS data in 3K chunks and reads more data from the HTTP Input Stream as and when required.

[0021] To avoid having the user wait until all the UCS data has been downloaded into the browser cache the plug-in invokes the browser Attachment Viewer as soon as 3Kb of UCS data is available (step A6 in Figure 4A) for parsing and display of the UCS content. Then, the Attachment Viewer parses and displays the UCS data in 3 Kb increments (step A7 in Figure 4A), thereby simulating the well known attachment viewing experience when viewing an attachment via email on a mobile device, using the "More" feature. Browser process then ends (step A8 in Figure 4A)

[0022] To preserve storage within device 3, the Attachment Viewer does not persist (i.e. save) the converted file when a conversion is requested through the plug-in. Closing the Attachment Viewer returns the user back to the previous web page from which the Get Link request was originally invoked.

[0023] As discussed above, in order to communicate with the Attachment Server 7 upon receiving requests from the browser plug-in, MDS 5 uses a dedicated transcoder that handles all request and response communication with the Attachment Server 7. Supported content types for the Attachment Server 7 are registered by the transcoder (e.g. application/pdf->application/vnd.company.ucs).

[0024] Alternatives and variations to the preferred embodiment will be understood to a person of skill in the art.

[0025] Many features and advantages are apparent from the detailed specification and, thus, it is intended by the appended claims to cover all such features and advantages. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to impose any limit on the exact construction and operation illustrated and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the claims appended hereto.

CLAIMS

What is claimed is:

1. A method of displaying a document identified by a URL on a mobile browser, comprising:

registering an attachment viewer plug-in to said mobile browser for a predetermined data stream content type;

registering a mobile data service transcoder for predetermined document types;

sending a request for said document of one of said predetermined document types from said mobile browser to said mobile service transcoder;

retrieving and converting said document to said predetermined data stream content type; and

forwarding the converted document from said mobile data service transcoder to said mobile browser for display via said attachment viewer plug-in.

2. The method of clam 1, wherein said attachment viewer plug-in starts to display said converted document upon receiving an initial portion of said converted document.

3. The method of claim 2, wherein said initial portion is about 3 Kb.

4. The method of claim 1, wherein said predetermined data stream content type is Universal Content Stream (UCS).

5. The method of claim 4, wherein said mobile browser adds an indication of said UCS content type when sending said request for said document to said mobile service transcoder.

6. The method of claim 1, wherein said predetermined document types are selected from .doc, .pdf, ppt, .xls, .pps, .wpd, .dot.

7. Apparatus for displaying a document of a predetermined document type identified by a URL on a mobile browser, comprising:

an attachment viewer plug-in to said mobile browser for displaying attachments conforming to a predetermined data stream content type; and

a mobile data service transcoder for receiving a request for said document from said mobile browser and initiating retrieval and conversion of said document from said predetermined document type to said predetermined data stream content type, and

transmitting said converted document to said mobile browser for display via said attachment viewer plug-in.

8. The apparatus of claim 7, wherein said attachment viewer plug-in starts to display said converted document upon receiving an initial portion of said converted document.

9. The apparatus of claim 8, wherein said initial portion is about 3 Kb.

10. The apparatus of claim 7, wherein said predetermined data stream content type is Universal Content Stream (UCS).

11. The apparatus of claim 10, wherein said mobile browser adds an indication of said UCS content type when sending said request for said document to said mobile service transcoder.

12. The apparatus of claim 7, wherein said predetermined document types are selected from .doc, .pdf, ppt, .xls, .pps, .wpd, .dot.

13. A method of displaying a document of a predetermined document type identified by a URL on a mobile browser, comprising:

registering an attachment viewer plug-in to said mobile browser for a predetermined data stream content type;

sending a request for said document from said mobile browser for remote retrieval and conversion of said document to said predetermined data stream content type; and

displaying the converted document via said attachment viewer plug-in.

14. The method of clam 13, wherein said attachment viewer plug-in starts to display said converted document upon receiving an initial portion of said converted document.

15. The method of claim 14, wherein said initial portion is about 3 Kb.

16. The method of claim 13, wherein said predetermined data stream content type is Universal Content Stream (UCS).

17. The method of claim 16, wherein said mobile browser adds an indication of said UCS content type when sending said request for said document.

18. The method of claim 13, wherein said predetermined document type is selected from . .doc, .pdf, ppt, .xls, .pps, .wpd, .dot.

19. A method of preparing a document for remote display, comprising:

registering for predetermined document types;

receiving a request for said document of one of said predetermined document types;

retrieving and converting said document to a predetermined data stream content type suitable for remote display; and

transmitting the converted document for remote display.

20. The method of clam 19, wherein said predetermined data stream content type is Universal Content Stream (UCS).

21. The method of claim 20, wherein said predetermined document types are selected from . .doc, .pdf, ppt, .xls, .pps, .wpd, .dot.

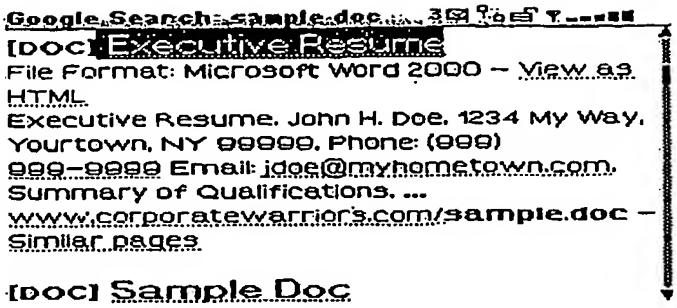

Figure 1A

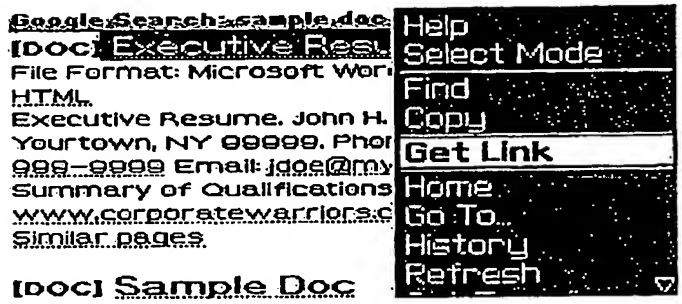

Figure 1B

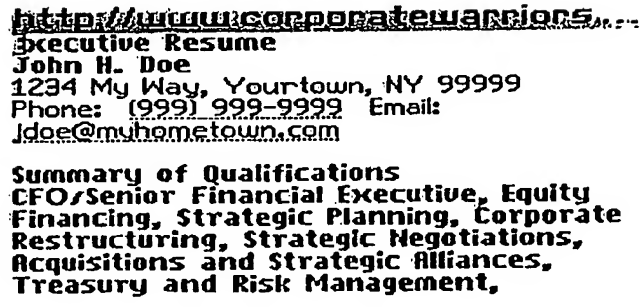

Figure 2

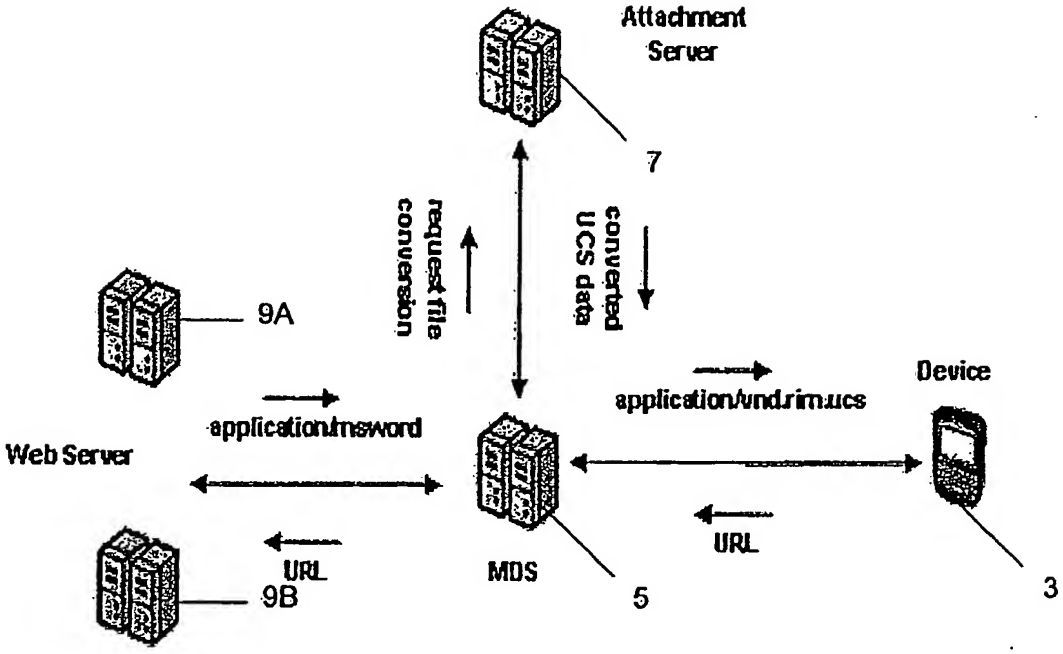
Attachment Server
7
request file conversion
converted UCS data
9A
application/msword
application/vnd.rim.ucs
Device
Web Server
MDS
URL
URL
9B
5
3

Figure 3

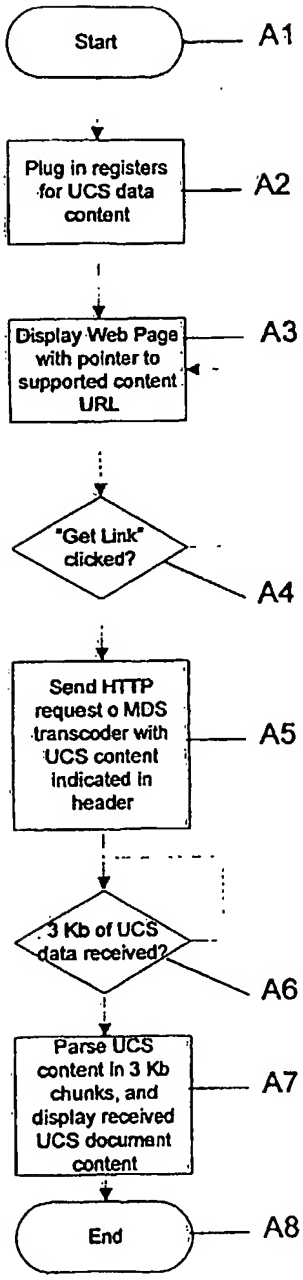
Start
A1
Plug in registers for UCS data content
A2
Display Web Page with pointer to supported content URL
A3
"Get Link" clicked?
A4
Send HTTP request o MDS transcoder with UCS content indicated in header
A5
3 Kb of UCS data received?
A6
Parse UCS content in 3 Kb chunks, and display received UCS document content
A7
End
A8

Figure 4A

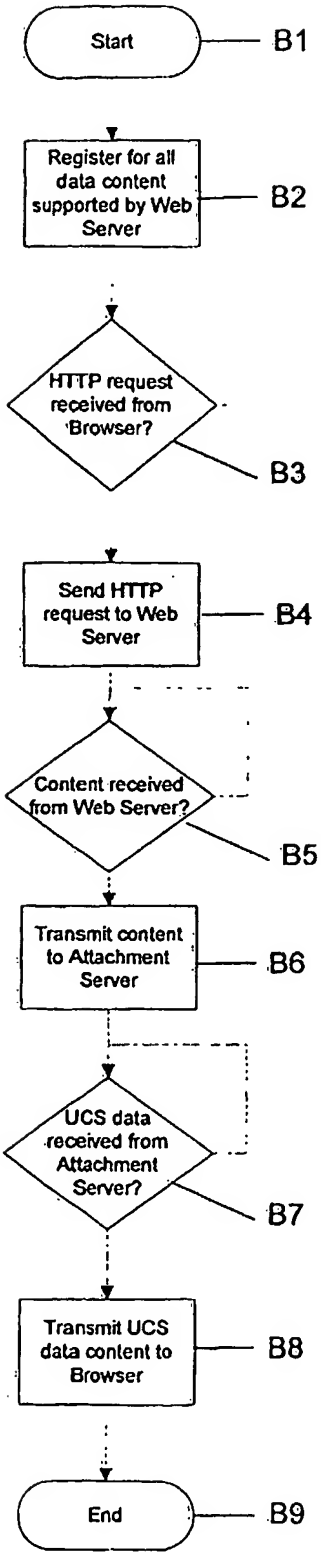
Start
B1
Register for all data content supported by Web Server
B2
HTTP request received from Browser?
B3
Send HTTP request to Web Server
B4
Content received from Web Server?
B5
Transmit content to Attachment Server
B6
UCS data received from Attachment Server?
B7
Transmit UCS data content to Browser
B8
End
B9

Figure 4B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US05/37219

A. CLASSIFICATION OF SUBJECT MATTER
IPC: G06F 17/30(2006.01)

USPC: 707/10;709/217;715/501.1
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 707/10; 709/217; 715/501.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,857,102 B1 (BICKMORE et al) 15 February 2005 (15.02.2005), abstract, column 3, lines 36 - 54, column 9, lines 55 - 67, column 10, lines 1 - 4, column 12, lines 16 - 54.	1-21
Y	US 5,911,776 A (GUCK) 15 June 1999 (15.06.1999), abstract, Figures 7 and 8; column 1, lines 48 - 57; column 2, lines 20 - 26; column 5, lines 19 - 24; column 17, line 32 - column 18, line 14.	1 - 21

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 March 2006 (30.03.2006)	20 APR 2006
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer Shahid Al Alam for James R. Matthews Telephone No. (571) 272-1400

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